

REMARKS

In the July 6, 2010 Office Action, claims 1 and 3 stand rejected in view of prior art. No other objections or rejections were made in the Office Action.

Status of Claims and Amendments

In response to the July 6, 2010 Office Action, Applicant has amended claim 1 as indicated above. Thus, claims 1 and 3 are pending, with claim 1 being the only independent claim. Reexamination and reconsideration of the pending claims are respectfully requested in view of above amendments and the following comments.

Rejections - 35 U.S.C. § 103

In paragraphs 3-5 of the Office Action, claims 1 and 3 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,592,346 (Bushnell) in view of U.S. Patent No. 4,172,465 (Dashner) and U.S. Patent Application Publication No. 2002/0012696 (Kouno et al.). In response, Applicant has amended independent claim 1 as mentioned above.

In particular, independent claim 1 now clearly recites that the discharge port being tapered from the outlet to the inlet, the protruding part being tapered toward a distal end thereof substantially in a same shape as the discharge port, an end face of the protruding part being substantially flush with a rim of the inlet of the discharge port when the protruding part enters the discharge port to close the discharge port, and a constant space being provided between a slope surface of the protruding part and a corresponding slope surface of the discharge port when the protruding part enters the discharge port to close the discharge port.. Clearly this arrangement is **not** disclosed or suggested by the Bushnell patent, the Dashner patent and/or the Kouno et al. publication individually or in combination.

The present invention is directed to a reed valve (e.g., a poppet valve) having a protruding part tapered toward the distal end thereof substantially in the same size as the discharge port. Specifically, the present invention aims to reduce the dead volume of the discharge port, and to avoid reduction in sectional area of a flow passage in the discharge port when the valve is full opened.

Bushnell (U.S. Patent No. 6,592,346) discloses a reed valve consisting of a poppet valve having a protruding part similar to that of the present application. In Bushnell, however, the discharge port is cylindrical, while the protruding part is hemispherical. The shapes of the discharge port and the protruding part of Bushnell are completely different, and the protruding part is considerably small relative to the discharge port. Thus, Bushnell lacks the protruding part being tapered toward a distal end thereof substantially in a same shape as the discharge port, and an end face of the protruding part is substantially flush with a rim of the inlet of the discharge port when the protruding part enters the discharge port to closed the discharge port, as required by independent claim 1. Additionally, with this structure of Bushnell, it is almost impossible to reduce the dead volume of the discharge port. Further, the reduction in sectional area of the flow passage in the discharge port particularly when the valve is fully opened is less likely to occur. Therefore, Bushnell has no intention of reducing the dead volume, and avoiding the reduction in sectional area of the flow passage when the valve is fully opened.

Dashner (U.S. Patent No. 4,172,465) discloses a check valve consisting of a ball valve. The check valve includes a semi-spherical valve member, and a discharge port tapered from the outlet to the inlet. Thus, Dashner lacks the protruding part being tapered toward a distal end thereof substantially in a same shape as the discharge port, and an end face of the protruding part is substantially flush with a rim of the inlet of the discharge port when the protruding part enters the discharge port to closed the discharge port, as now required by independent claim 1. In fact, the discharge port and valve member of Dashner have completely different shapes. Moreover, the valve member of Dashner is movable in the axial direction of the discharge port. With this check valve, particularly when the valve is fully opened, the flow passage area from the inlet to the outlet of the discharge port gradually increases. That is, the flow passage area will not be reduced. Further, unlike the discharge valve in a compressor, there is no need of reducing the dead volume, since this valve of Dashner is not used in a compressor. Therefore Dashner cannot provide any reason to modify the shape(s) of the valve member and/or discharge port to result in the unique arrangement of independent claim 1, as now amended.

For the reasons above, even if the two cited references are combined, such combined teachings merely modify the discharge port of the reed valve of Bushnell to be tapered. Thus,

the combined teachings of these references do not disclose suggest determining the shapes of the discharge port and the valve in connection with the sectional area of the flow passage in the discharge port particularly when the valve is fully opened, i.e., the two cited references do not provide any suggestion of (reason to) avoiding the reduction in sectional area of the flow passage that is easily caused by tapering the protruding part according to the shape of the discharge port, as now clearly required by independent claim 1. In other words, since neither references discloses or suggests the protruding part being tapered toward a distal end thereof substantially in a same shape as the discharge port, and an end face of the protruding part is substantially flush with a rim of the inlet of the discharge port when the protruding part enters the discharge port to closed the discharge port, a hypothetical device created by combining these references cannot result in the unique arrangement of independent claim 1 as now amended. Accordingly, withdrawal of this rejection of independent claim 1 is respectfully requested.

The Office Action acknowledges that Dashner and/or Bushnell fail to teach that an end face of the protruding part is substantially flush with a rim of the inlet of the discharge port. However, the Office Action asserts that Kouno utilizes such a discharge valve, referencing Figure 6(c) of the Kouno et al. publication. The Office Action then asserts that it would be obvious to combine this feature from Kouno in the hypothetical device created by combining Bushnell and Dashner so as to improve performance as explained in page 4 of the Office Action.

However, according to Kouno (U.S. Patent Publication No.2002/0012595), a constant space is not provided between a slope surface of a valve 17 and a slope surface of a valve seat 18 when the valve 17 is seated on the valve seat 18 (see FIG 6(c) of Kouno). Rather, the slope surface of the valve 17 is gently curved in such a manner that the slope surface of the valve 17 can contact the slope surface of the valve seat 18 even when the valve 17 is inclined (see FIGS 8(a) and 8(b) of Kouno). Thus, the structure taught by Kouno is different from the structure Now set forth in independent claim 1. Additionally, the valve of Kouno is not a reed valve whatsoever, and thus, one of ordinary skill in the art would not attempt to combine the structure thereof with a reed valve, such as disclosed in Bushnell. based on the reasons above, the hypothetical combination of the Bushnell patent, the Dashner patent and/or the Kouno et al. publication would not result in the unique arrangement of independent claim 1,

as now amended. Accordingly, withdrawal of this rejection of independent claim 1 is respectfully requested.

Under U.S. patent law, the mere fact that the prior art can be modified does *not* make the modification obvious, unless an *apparent reason* exists based on evidence in the record or scientific reasoning for one of ordinary skill in the art to make the modification. See, KSR Int'l Co. v. Teleflex Inc., 127 S.Ct. 1727, 1741 (2007). The KSR Court noted that obviousness cannot be proven merely by showing that the elements of a claimed device were known in the prior art; it must be shown that those of ordinary skill in the art would have had some "apparent reason to combine the known elements in the fashion claimed." Id. at 1741. The current record lacks any apparent reason, suggestion or expectation of success for combining the patents to create Applicants' unique arrangement of independent claim 1.

Moreover, Applicant believes that dependent claim 3 is also allowable over the prior art of record in that it depends from independent claim 1, and therefore is allowable for the reasons stated above with respect to independent claim 1. Also, dependent claim 3 is further allowable because it includes additional limitations, which in combination with the limitations of independent claim 1, are not disclosed or suggested in the prior art of record. Accordingly, withdrawal of this rejection of dependent claim 3 is also respectfully requested.

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In view of the foregoing amendment and comments, Applicant respectfully asserts that claims 1 and 3 are now in condition for allowance. Reexamination and reconsideration of the pending claims are respectfully requested.

Respectfully submitted,

/Patrick A. Hilsmier/
Patrick A. Hilsmier
Reg. No. 46,034

GLOBAL IP COUNSELORS, LLP
1233 Twentieth Street, NW, Suite 700
Washington, DC 20036
(202)-293-0444

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